has been almost exclusively on the physical side.

Ramsey and Shields,[28] by their work on the surface energy of homogeneous liquids, have developed a method for the determination of the molecular weights of this class of bodies.

Traube's exhaustive study of the specific gravity of solutions, promises, if all that he claims be true, and much of it seems to be, to bring order out of an almost interminable chaos of empirical data. Among other things his work has given a new and very rapid method for the determination of molecular weights.

I will not take the time to refer in detail to the work of Brühl and others on the refraction and dispersion of light as dependent on the composition and structure of bodies; to the work of Thomsen, of Stohman and of Berthelot upon thermo-chemistry; to the work of Guye, Walden and others on specific and molecular rotation, and of Perkin on electro-magnetic rotation of polarized light; and to the work of Rowland on spectrum analysis.

In all of these fields and in many others a vast accumulation of empirical data has been secured. This wealth of experimental material has been accompanied and supplemented by theoretical discussions, and many interesting relations have been discovered. Physical chemistry has proved one of the most enticing and profitable fields for work in recent years and claims many enthusiastic investigators in our own country as well as abroad. In the development of the subject perhaps no one has contributed more than Ostwald by his Lehrbuch and by his ably edited Zeitschrift für physikalische Chemie. We may congratulate ourselves that our workers in America are now to have a journal of their own, and we may confidently hope that the new *Journal of Physical Chemistry* will contribute much toward 'the chemistry of the future.'

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W. A. Noyes.

Rose Polytechnic Institute,
Terre Haute, Ind.

SECTION C.—CHEMISTRY.

Section C. of the American Association for the Advancement of Science was called together for organization on Monday, August

31st, at 11:30 a. m. Vice-President W. A. Noyes of Terre Haute, Ind., was in the chair, and F. P. Venable, of Chapel Hill, N. C., was Secretary.

Dr. E. A. de Schweinitz, of Washington, was chosen member of the Council, and Dr. Charles H. Herty, of Athens, Ga., Press Secretary. Dr. A. L. Springer was elected member of the Nominating Committee. Drs. McMurtrie, Norton and Baskerville were added to the committee to nominate officers of the Section, and Prof. F. C. Phillips, Prof. S. A. Lattimore and Prof. F. W. Clarke were added to the Sectional Committee.

The Section then adjourned until 4:30 p. m. At that hour the Section assembled to hear the Vice-Presidential address of Prof. W. A. Noyes. He was introduced in a few appropriate words by the Vice-President for 1895, Dr. Wm. McMurtrie, and made an address on 'The Achievements of Physical Chemistry,' which is printed in full above.

On Tuesday the Section assembled at 11 a. m. and the regular program of papers was taken up.

Prof. F. W. Clarke reported for the committee on indexing chemical literature. In addition he reported work now in progress by Dr. Bolton on the preparation of an index of inaugural dissertations. This is the first effort to index this matter.

Dr. Edward Hart reported on the loan made by the Association to him for prosecuting work on the method of preparation and purification of glucinum. The work is not yet complete, but he hopes to prepare glucinum on a commercial scale by reduction of the oxide with magnesium in a glucina crucible. The Section expressed approval of the work.

The following papers were presented before the Section.

PHYSICAL CHEMISTRY.

A. A. Noyes and G. C. Abbott, Massachusetts Institute of Technology: on 'Determination of Osmotic Pressure from Vapor Pressure Measurements.' The authors derive, from thermo-dynamical considerations, a formula by means of which the osmotic pressure can be calculated directly from the vapor pressure, and deduce from it the law that osmotic pressure and work are directly proportional to one another, no specific volume correction being required as assumed by many previous investigators. The authors further describe an experimental method for determining vapor pressure and communicate measurements on ether solutions of napthaline and azo-benzene. The results show that vant' Hoff's law of the identity of osmotic and gas pressure under similar conditions is fully confirmed, and that the osmotic pressure varies almost directly as the concentrations.

W. D. Bancroft, Cornell University: 'Distillation with Vapor.' From experimental data the author is led to conclude that solids present in vapors obey certain chemical laws, and are not simply mechanically suspended in the vapor. The author is now engaged in a revision of the experimental data.

H. C. Jones, Johns Hopkins University: 'A Physico-chemical Study of Water Solutions of some of the Alums.' By electrical conductivity measurements the author shows that in rather concentrated solutions there is present some of the undissociated double salt. In very dilute solutions, complete dissociation takes place.

J. H. Kastle, State College of Kentucky: 'The Hydrolysis of the Sulphonic Ethers.' The hydrolysis of the sulphonic ethers is brought about by water and also by the alcohols. It was found that in solution in acetone, water is about 3.5 times stronger in its hydrolyzing power than methyl and ethyl alcohol, which were found to be about equal in this capacity. It was found also that acids do not act by catalysis on the sulphonic ethers, but actually enter into double

decomposition with them. It was found further that not only acids, but all electrolytes, react in the same way on the sulphonic ethers, and as might be expected all electrolytes were found to react upon the sulphonic ethers much more rapidly than water.

C. E. Linebarger, Chicago: 'On the Nature of Isomorphous Mixtures.' The author gives an historical review of the two views held as to the nature of isomorphous mixtures, namely, that of mechanical mixtures, or solid solutions. From experiments upon the rate of desiccation of isomorphous mixtures of sulphates the author concludes that this is a case of solid solution and not a mechanical mixture.

R. B. Warder, Washington, D. C.: 'A Discussion of Lichty's Experiments on the Speed of Esterification.' The 'coefficient of speed' in each case, as deduced by means of the formulas for reversible reactions, is shown to vary in the progress of the reaction; first diminishing, then nearly constant or slightly increasing, and finally diminishing very rapidly. Suggestions are thus gained regarding the nature of secondary influences involved.

H. M. Goodwin, Massachusetts Institute of Technology: 'The Hydrolysis of Ferric Chloride.' The author calculates the degree of hydrolysis of ferric chloride from conductivity and freezing point determinations, finding it to be inappreciable in fairly concentrated solutions (*e. g.*, decinormal), but nearly complete in more dilute ones (*e. g.*, millinormal). He also describes and discusses the remarkable increase in conductivity with the time which such solutions manifest.

A. A. Noyes and H. M. Goodwin: 'The Viscosity of Mercury Vapor.' By determinations of the viscosity coefficients of gases it is possible to calculate the relative cross-sections of the molecules of the gases. From measurements of the viscosity of mercury and carbon dioxide it is found that the spaces between the atoms of molecules are probably not large. The authors conclude that atoms and molecules are of the same order of magnitude.

INORGANIC CHEMISTRY.

F. W. Clarke, Washington, D. C.: 'Some Points in Nomenclature with regard to Analysis of Mineral Water.' It was pointed out that in the light of modern theories of solution the present method of reporting water analyses are totally erroneous. Suggestions were asked as to nomenclature in case of reporting SO_4, CO_3, etc.

C. H. Herty and H. V. Black, University of Georgia: 'The Alkali Tri-Halides.' The authors show that the successive crops of crystals obtained in the preparation of rubidium dibromiodide are identical, confirming thus the previously held view that these substances are true chemical compounds.

E. Goldsmith, Philadelphia: 'The metamorphosis of Fossil Bone into a mineral.' The author showed the substitution of carbonic acid for phosphoric acid, calcium carbonate crystallizing as aragonite.

J. L. Howe, Washington and Lee University: 'A Bibliography of the Metals of the Platinum Group.' This work will be ready for print soon.

J. L. Howe: 'Examination of Water and Deposits from a Lake in Yucatan.' The deposits (mud) proved to be almost pure gypsum. A sample from the middle of the lake contains a large quantity of hydrogen sulphide, while another sample taken from the border contained none.

T. W. Richards and H. G. Parker, Harvard University: 'A Revision of the Atomic Weight of Magnesium.' From determinations of chlorine in magnesium chloride the authors find the atomic weight of magnesium to be 24.36.

ORGANIC CHEMISTRY.

William McPherson, Ohio State University: 'Hydrazones of Quinones.' This is an extension to the naphthoquinone of the previously published work on the action of phenyl hydrazine on quinones. Zincke's idea is confirmed, that in the action of phenyl hydrazine on a naphtha quinone there is a migration of a hydrogen atom of phenyl hydrazine to the C=O group.

A. A. Noyes: 'Synthesis of Diethyl Hexamethylene Ether and other Ethers from Trimethylene Glycol.' By replacing the hydrogen of one of the hydroxl groups by sodium, then replacing this sodium by the ethyl group, then replacing the remaining hydroxyl group by chlorine, a substance is obtained from which may be prepared the diethyl hexamethylene ether.

A. A. Noyes: 'Formation of Diacetylenyl (Butaiidine) from Copper Acetylene.' The following transformations were effected: $Cu-C=C-Cu+2CuCl_2=Cu-C\equiv C-C\equiv C-Cu$. This was transformed into $H-C\equiv C-C\equiv C-H$ (Butaiidine).

This hydrocarbon takes up directly six atoms of bromine.

W. A. Noyes, Rose Polytechnic Institute: 'Camphoric Acid.' The author shows that one of the carboxyl groups of camphoric acid is primary, the other is tertiary. He further shows that camphoric acid is a derivative of succinic and not of glutaric acid. From a study of the constitution of campholitic acid he hopes to obtain accurate evidence upon the constitution of camphoric acid.

P. Fireman, Washington, D. C.: 'Introduction of Alkyl Iodides into Phosphines by means of Ethers.' This was accomplished by heating phosphonium iodide with ethers in sealed tubes. Reaction takes place more readily than with alcohol.

S. H. Bear and A. B. Prescott, University of Michigan: 'Dipyridine Methylene Iodide and the Non-formation of Corresponding Donopyridine Products.' This is a continuation of work previously published on the periodides of the nitrogen basis.

C. Loring Jackson and W. R. Lamar, Harvard University: 'On the Behavior of Trichlordinotrobenzol with Various Reagents,' 'On the action of Nitric Acid on Potassic Cobalticyanide,' 'On the action of Sodic Ethylate on Dinitranissic Acid.' In the absence of the authors, Dr. Howe persented a brief abstract of these three papers.

DIDACTIC CHEMISTRY.

F. P. Venable, University of North Carolina: 'The use of the Periodic Law in Teaching General Chemistry.' The author advocated adherence, as far as possible, to the periodic law in teaching general chemistry.

W. P. Mason, Rensselaer Polytechnic Institute: 'Chemistry at the Rensselaer Polytechnic Institute.'

A. A. Noyes: 'Laboratory Instruction in Organic Chemistry.' The author called attention to the need of greater ability on the part of students to identify the more common organic compounds, or, at least, the classes of compounds. He furnishes students with group reactions of common organic compounds, then with methods of separation.

A. A. Noyes: 'The Teaching of Physical Chemistry.' The author asked that courses in theoretical chemistry include more of the recently developed views and that such a course be accompanied by a laboratory course.

Ellen H. Richards, Massachusetts Institute of Technology: 'Instruction in Sanitary Chemistry at the Massachusetts Institute of Technology.'

T. H. Norton, University of Cincinnati: 'Points in Teaching Technical Chemistry.' The author pointed out the necessity of visiting several commercial plants with the

class. He then called attention to the preliminary preparation which should be had and showed how the details of the plant could be better understood by the aid of a printed syllabus, the various parts of the apparatus being labelled in accord with the syllabus. Application of points of interest should be made in laboratory work. Well written accounts of the visit should be made, and finally, analyses should be made of samples obtained on the trip, especially as showing the quantitative proportion of material used and produced. In the discussion which followed all were unanimous that there was great necessity for higher chemical training and training in mechanical engineering for technical chemists.

G. C. Caldwell, Cornell University: 'The Aim of Qualitative Analysis.' It is much more than mere identification of particular substances; it furnishes fine training in careful manipulation and accurate observation; the student learns the importance of small things, his judgment is trained. It requires a thorough study of wider fields of chemistry and teaches classification.

A. L. Green, Purdue University: 'The Teaching of Qualitative Analysis.' This was an account of the specific method of teaching quantitative analysis at Purdue.

Ellen H. Richards: 'Some points in the use of Depth of Color as a measure of Chemical Contents.' This is a continuation of the line of work reported on at the Springfield meeting.

ANALYTICAL CHEMISTRY.

J. L. Howe and P. S. Mertins, Washington and Lee University: 'Notes on Reinsch's test for Arsenic and Antimony.' The work shows that an experienced observer will never fail to distinguish arsenic and antimony by this test.

Erwin E. Ewell, Washington, D. C.: 'A new form of Laboratory Condenser.'

Erwin E. Ewell: 'A Method of Manipulation for the Colorimetric Determination of Ammoniacal Nitrous and Nitric Nitrogen in Bacterial Culture.'

H. W. Wiley, Washington, D. C.: 'A Modified form of the Ebullioscope.'

TECHNICAL CHEMISTRY.

A. R. Leeds, Stevens Institute: 'Recent developments in the Purification and Filtration of Water.' This paper was largely historical. The author takes the position that it is better to purify water at hand than go long distances for it.

F. C. Phillips, Allegheny, Pa.: 'Some Properties and uses of Natural Gas.' From comparison of the composition of natural gas with that of coal gas, the author concludes that their methods of formation are not the same.

F. C. Phillips: 'A new Method for the Determination of Sulphur in White Iron.'

C. L. Reese, Charleston, S. C.: 'On Recent Improvements in the Manufacture of Sulphuric Acid.'

H. A. Weber, Ohio State University: 'Use of Coal for Colors in Food.' From experiments on four coal-tar colors—methyl, orange, coraline, yellow, saffroline and magenta—the author finds that no one of these affects both peptic and pancreatic digestion, but that each affects seriously one form or the other. In the discussion which followed it was held that too much importance is attached to such experiments, owing to the extremely small quantities used in food stuffs.

Erwin E. Ewell: 'The Alkaloids of Anhelonium Lewinii (Mescal Buttons).'

SANITARY CHEMISTRY.

W. P. Mason: 'Well Water.' The author considers that impurities from the surface may come through soaking, in addition to surface entrance. He considers well-selected water sources much better than domestic wells. It is noticeable that in rural districts farmers are especially

careless with the disposition of refuse matter.

E. A. de Schweinitz, Washington, D. C.: 'Value and Use of Formaldehyde as a Disinfectant.' Anthrax, Tetanus, etc., are destroyed by formaldehyde. It possesses many good points as a disinfectant. It is a good deodorizer, only a small quantity being required, 1 cc. in ten liters of water. This is applied by spraying. It is a good preventative of decomposition. The amount of the gas in a confined space is determined by absorption in strong caustic soda or alkaline permanganate. One objection to its use has been the length of time necessary to remove the sharp odor of the formaldehyde. This can be largely hastened by spraying with ammonia.

E. G. Smith, Beloit College, Wis.: 'Observations on the Sanitary Nature of the Mississippi River Water at Different Seasons.'

AGRICULTURAL CHEMISTRY.

L. L. Van Hyde, Geneva, N. Y.: 'The work of the Agricultural Chemists of America.' The author gave a general review of the various lines of investigation pursued by the agricultural chemists. He pointed out what valuable service had been rendered in preventing fraudulent practices. An account was also given of the Association of Official Agricultural Chemists.

S. M. Babcock and H. L. Russell, University of Wisconsin: 'Conditions affecting the Normal Viscosity of Milk,' 'On the Restoration of the Viscosity of Pasteurized Milk.'

BIOLOGICAL CHEMISTRY.

V. K. Chestnut, U. S. Department of Agriculture: 'Andromedotoxin, the Poisonous constituent of the Ericaceae and its Relation to some Food Products.' It has been shown that honey from bees feeding on the plant contains the poison; further that meat of animals feeding on the leaves contains the poison and is a source of contamination.

On Thursday the Council of the A. A. A. S. authorized the fusion of Section C with the summer meeting of the American Chemical Society, the first two days of the meeting to be conducted officially by those of the American Chemical Society. The members of the American Chemical Society are to have the privilege of reading papers in Section C, and *vice versa*.

This matter is subject to the action of the Council of the American Chemical Society.

Section C nominated Professor Wolcott Gibbs, of Newport, R. I., to be an honorary member of the A. A. A. S. The Secretary was ordered to cast the ballot.

Dr. William P. Mason was nominated for Vice-President of the Section and Prof. P. C. Freer, for Secretary for the year 1897.

F. P. VENABLE, *Secretary*,
and CHAS. H. HERTY,
Press Secretary Section C.

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*THE EMBLEMATIC USE OF THE TREE IN THE DAKOTAN GROUP.**

THE tribes of the Dakotan or Siouan linguistic stock aggregate in number about 45,000 Indians. Grouped according to a close relationship of language, we find in the United States: 32,000 in the Dakota; 4,000 in the Omaha, Ponka, Quapa, Kanza and Osage; 800 in the Iowa, Otoe and Missouri; 2,200 in the Winnebago, and 3,000 in the Hidatsa, Mandan and Crow tribes. The remaining 3,000 are widely scattered, with the greater part living in the provinces of Canada.

At the beginning of the seventeenth century a number of tribes belonging to this stock dwelt on a strip of the Atlantic coast, now within the limits of North and South

*Address by the Vice-President, before Section H—Anthropology.